Energy Information Administration www.eia.doe.gov

COUNTRY ANALYSIS BRIEFS

Egypt

Last Updated: February 2011

Background

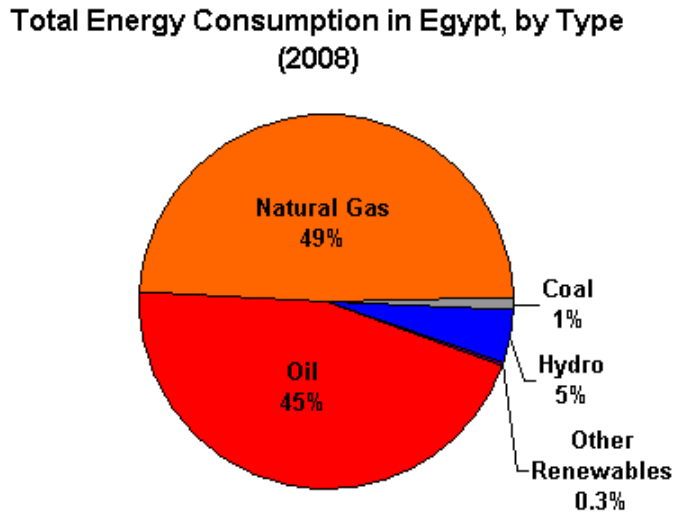
Egypt is a significant oil producer and a rapidly growing natural gas producer. The Suez Canal and Sumed Pipeline are strategic routes for Persian Gulf oil shipments, making Egypt an important transit corridor for world energy markets.

Hydrocarbons play a sizeable role in Egypt's economy both from oil and natural gas production and also in terms of revenues from the Suez Canal, an important transit point for oil shipments out of the Persian Gulf. Total oil production, however, has declined since the country's 1996 peak of close to 935,000 barrels per day (bbl/d) to current levels of about 660,000 bbl/d. Egypt's consumption is slightly higher than production and the country has begun to rely on a small volume of imports to meet domestic demand. Egypt also has the largest oil refining sector in Africa and since refining capacity now exceeds domestic demand, some non-Egyptian crudes are currently imported for processing and re-export.

Decreases in oil production have been offset by the rapid development of the natural gas sector for both domestic consumption and export. Over the past decade, Egypt has become a significant natural gas producer and a strategic source for European natural gas imports. Egypt currently has a pipeline network for exports to Eastern Mediterranean countries in addition to liquefied natural gas (LNG) exports to Europe, Asia, and the Americas. However, increasing domestic demand for natural gas has led the government to stall natural gas export expansion plans. The government has been actively working to attract foreign investments in the sector to increase exploration, production and downstream activities.

In addition to oil and gas production, Egypt plays an important role in international energy markets through the operation of the Suez Canal and Suez-Mediterranean (SUMED) Pipeline, two routes for the export of Persian Gulf oil and LNG. Fees collected from operation of these two transit points is a significant source of revenue for the Egyptian government.

Almost all of Egypt's 3.2 quadrillion British thermal units (Btu) of energy consumption in 2008 was met by oil (45 percent) and natural gas (49 percent). Oil's share of the energy mix is mostly in the transportation sector but with the development of compressed natural gas (CNG) infrastructure and vehicles, the share of natural gas in the transportation sector is expected to grow.



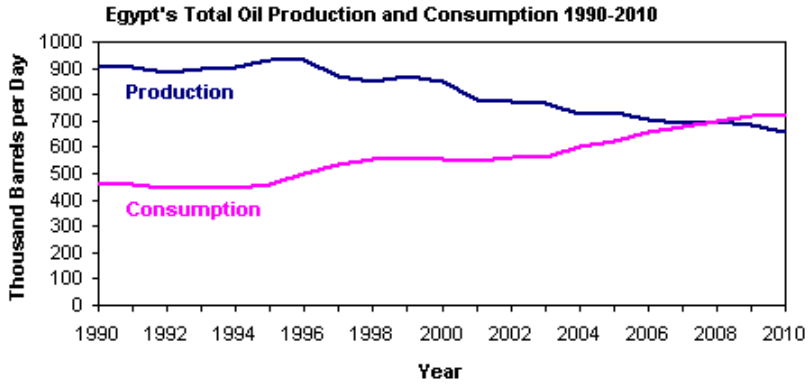
Source: EIA

In terms of electricity generation, natural gas accounts for over 70 percent of the total mix, woth the remainder being met mostly by hydroelectricity. Plans are underway to further expand electricity generation capacity by utilizing the country's vast wind and solar resources, expanding the Gulf Cooperation Council (GCC) Power Grid, and also through development of nuclear power.

Oil

Egypt is now reliant upon oil imports to meet domestic energy demand.

According to the *Oil and Gas Journal*'s January 2011 estimate, Egypt's proven oil reserves stand at 4.4 billion barrels, an increase from 2010 reserve estimates of 3.7 billion barrels. In 2010, Egypt's total oil production averaged 660,000 (bbl/d), of which approximately 540,000 bbl/d was crude oil. Despite new discoveries and enhanced oil recovery (EOR) techniques at mature fields, crude oil production continues its decline. At the same time, new natural gas field production has led to increases in the production of natural gas liquids and lease condensates which have offset some of the declines in total oil liquids production. Oil consumption is estimated to be close to 710,000 bbl/d, slightly higher than production. Oil imports are expected to continue with some refined product exports in the short-term, but are still contingent on domestic demand growth. The country did register a small volume of net oil imports in 2010. These imports are, in part, the result of Egypt's refining capacity being larger than oil production levels (see Refinery section below).



Source: EIA

Domestic demand for petroleum products continues to grow. The government had been planning to reduce demand growth by gradually lifting subsidized prices and targeting subsidies more effectively. This is a politically sensitive issue that will be difficult to fully implement. The increased use of compressed natural gas as a fuel for motor vehicles is one trend that may aid government efforts in curbing demand, but natural gas is also subsidized and increasing consumption is beginning to affect natural gas exports.

Sector Organization

The Egyptian General Petroleum Corporation (EGPC) is the state entity charged with managing upstream activities including infrastructure, licensing, and production. International and foreign

national oil companies play a significant role in Egypt's upstream sector on a production-sharing basis with EGPC. The energy sector is broken up into three holding companies in addition to the EGPC and the Egyptian Mineral Resource Authority (EMRA): the Egyptian Natural Gas Holding Company (EGAS), the Egyptian Petrochemicals Holding Company (ECHEM), and Ganoub El Wadi Petroleum Holding Company (GANOPE).

Exploration and Production

Egyptian oil production comes from five main areas: primarily the Gulf of Suez and the Nile Delta but also the Western Desert, the Eastern Desert, and the Mediterranean Sea. Most Egyptian production is derived from mature, relatively small fields that are connected to larger regional production systems. Overall production is in decline, particularly from the older fields in the Gulf of Suez. However, some declines have been offset by small yet commercially viable discoveries in all producing areas.

Exports

Although a net oil importer, Egypt did register about 145,000 bbl/d of crude oil exports in 2010. The majority of these exports went to India (50,000 bbl/d), followed by Italy (29,000 bbl/d), and the United States (16,000 bbl/d). The remainder of Egypt's crude oil exports went to other European countries and Asia.

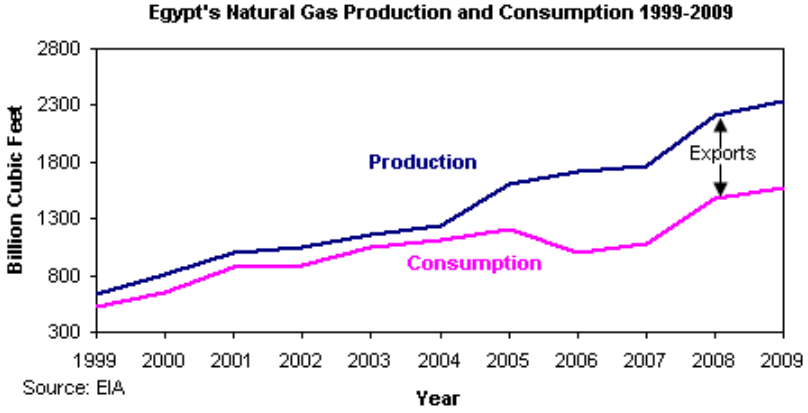
Refining

Egypt has the largest refining sector on the African continent with ten refineries and a combined crude oil processing capacity of 975,000 bbl/d (OGJ and APS Review). The largest refinery is the 146,300-bbl/d El-Nasr refinery at Suez, which is owned by the Egyptian government through the EGPC and operated by its subsidiary, the El Nasr Petroleum Company. The government has plans to increase production of lighter products, petrochemicals, and higher octane gasoline by expanding and upgrading existing facilities and promoting new projects. Current plans call for expansion of refining capacity by over 600,000 bbl/d by 2016 and even further expansions into the next decade – requiring large amounts of foreign investment.

Natural Gas

Due to major recent discoveries, natural gas is likely to be the primary growth engine of Egypt 's energy sector for the foreseeable future.

Egypt's natural gas sector is expanding rapidly with production quadrupling between 1998 and 2009. According to the *Oil and Gas Journal*, Egypt's estimated proven gas reserves stand at 77 trillion cubic feet (Tcf), an increase from 2010 estimates of 58.5 Tcf and the third highest in Africa after Nigeria (187 Tcf) and Algeria (160 Tcf). In 2009, Egypt produced roughly 2.3 Tcf and consumed 1.6 Tcf. With the ongoing expansion of the Arab Gas Pipeline, and LNG facilities, Egypt will continue to be an important supplier of natural gas to Europe and the Mediterranean region.



According to Cedigaz, in 2009 the electricity sector accounted for the largest share of natural gas consumption (54 percent) followed by industrial sector (29 percent). While still a relatively small share, Egypt is beginning to incorporate natural gas into the transport sector through the use and development of compressed natural gas vehicles and fueling stations.

The government is also encouraging households, businesses and the industrial sector to consider natural gas as a substitute for petroleum and coal. In January 2008, the World Bank approved loans for the Natural Gas Connections Project, which serves to switch consumption of liquefied petroleum gas (LPG) to natural gas through investment in new connections and to further expand natural gas use in densely populated, low income areas.

Sector Organization

As is the case with the oil sector, the Egyptian General Petroleum Corporation (EGPC) is the state entity charged with managing upstream activities including infrastructure, licensing and production. The promotion of the sector along with the development strategy is managed by the

Egyptian Natural Gas Holding Company (EGAS). Both EGPC and EGAS work with private companies in joint venture partnerships.

The Egyptian government has an ongoing policy to allocate one third of proven natural gas reserves for domestic market requirements, one third for "future generations", and the remaining third for exports. Given increasing domestic demand, combined with popular pressures in recent years against LNG and gas export contracts (particularly with Israel), the oil minister declared in mid-2008 that no new gas export contracts would be made. These policies delayed plans to expand the export infrastructure and have also deterred some investment in the more expensive offshore areas.

Exploration and Production

Exploration and production activities in Egypt's natural gas sector continue to grow. While there have been marked decreases in the production of natural gas associated with oil extraction, new finds of non-associated gas fields combined with growing domestic demand and export capacity, are increasing interest in the Egyptian natural gas sector. Most industry analysts place Egypt's natural gas production on an upward trend in the short- and medium-term despite the existing limitations to the sector's growth. To promote exploration in the more expensive deepwater offshore, the Egyptian government revised pricing policies by agreeing to pay more for natural gas produced in these areas, assuring continued international interest in developing these potential resources.

Over 80 percent of Egypt's natural gas reserves and 70 percent of production is in the Mediterranean and Nile Delta but exploration and production continue in all major hydrocarbon rich areas including the Western Desert.

Exports

Egyptian began exporting natural gas in the mid-2000s with the completion of the Arab Gas Pipeline (AGP) in 2004 and the startup of the first three LNG trains at Damietta in 2005. In 2009, Egypt exported close to 650 billion cubic feet (Bcf) of natural gas, around 70 percent of which was exported in the form of LNG and the remaining 30 percent via pipelines.

Pipeline Exports

Egyptian pipeline exports travel through the Arab Gas Pipeline (AGP) that provides gas to Lebanon, Jordan and Syria with further additions being planned. The Arish-Ashkelon pipeline addition, which branches away from the AGP in the Sinai Peninsula and connects to Ashkelon, Israel began operations in 2008. Domestic pressure over contracts, pricing for exports to Israel, and technical problems caused a few interruptions but exports resumed in 2009.

Liquefied Natural Gas (LNG)

Egypt has three LNG trains: Segas LNG Train 1 in Damietta and Egypt LNG trains 1 and 2 in Idku. The combined LNG export capacity is close to 600 Bcf per year with plans to expand in the near future pending export policy changes and legislation. In 2009, LNG exports were approximately 450 Bcf. The largest recipient of Egyptian LNG for 2009 was the United States, which imported around 160 Bcf, representing 35 percent of Egyptian LNG exports for the year and also 35 percent of U.S. LNG imports. Other major destinations for Egyptian LNG include Spain (32 percent) and France (13 percent) with smaller volumes travelling to Canada, Mexico, Asia and other European countries.

Suez Canal/SUMED Pipeline

Closure of the Suez Canal and SUMED Pipeline would add an estimated 6,000 miles of transit around the continent of Africa.

Suez Canal

The Suez Canal is located in Egypt, and connects the Red Sea and Gulf of Suez with the Mediterranean Sea, spanning 120 miles. Year-to-date through November of 2010, petroleum (both crude oil and refined products) as well as liquefied natural gas (LNG) accounted for 13 and 11 percent of Suez cargos, measured by cargo tonnage, respectively. Total petroleum transit volume was close to 2 million bbl/d, or just below five percent of seaborne oil trade in 2010.

Almost 16,500 ships transited the Suez Canal from January through November of 2010, of which about 20 percent were petroleum tankers and 5 percent were LNG tankers. With only 1,000 feet at its narrowest point, the Canal is unable to handle the VLCC (Very Large Crude Carriers) and ULCC (Ultra Large Crude Carriers) class crude oil tankers. The Suez Canal Authority is continuing enhancement and enlargement projects on the canal, and extended the depth to 66 ft in 2010 to allow over 60 percent of all tankers to use the Canal.

Source: U.S. Government Click here to zoom

Closure of the Suez Canal and the SUMED Pipeline would divert oil tankers around the southern tip of Africa, the Cape of Good Hope, adding approximately 6,000 miles to transit, increasing both costs and shipping time. According to a report released by the International Energy Agency (IEA), shipping around Africa would add 15 days of transit to Europe and 8-10 days to the United States.

SUMED Pipeline

The 200-mile long SUMED Pipeline, or Suez-Mediterranean Pipeline provides an alternative to the Suez Canal for those cargos too large to transit the Canal (laden VLCC's and larger). The pipeline has a capacity of 2.3 million bbl/d and flows north from Ain Sukhna, on the Red Sea coast to Sidi Kerir on the Mediterranean. The SUMED is owned by Arab Petroleum Pipeline Co., a joint venture between the Egyptian General Petroleum Corporation (EGPC), Saudi Aramco, Abu Dhabi's National Oil Company (ADNOC), and Kuwaiti companies.

Source: Oil Capital Ltd.

Crude Oil

The majority of crude oil flows transiting the Canal travel northbound, towards markets in the Mediterranean and North America. Northbound canal flows averaged approximately 428,000 bbl/d in 2010. The SUMED pipeline accounted for 1.15 million bbl/d of crude oil flows along the route over the same period. Combined, these two transit points were responsible for over 1.5 million bbl/d of crude oil flows into the Mediterranean, with an additional 307,000 bbl/d travelling southbound through the Canal. Northbound crude transit represented a decline from 2008 when 940,000 bbl/d of oil transited northbound through the Canal and an additional 2.1 million travelled through the SUMED to the Mediterranean.

Suez Canal Hydrocarbon Traffic (2008 - November 2010)			
	2008	2009	2010*
NORTHBOUND			
Crude Oil (bbl/d)	940	314	428
Gasoline	429	379	413
Middle Distillate	150	261	250
Fuel Oil	6	19	6
Naptha	45	1	13
LPG	49	14	24
Other	2	7	20
Total Oil (bbl/d)	**1,621**	**994**	**1,153**
LNG (Bcf)	**316**	**803**	**1,320**
Number of ships			
Tankers	2,089	1,867	1,768
LNG	229	283	393
SOUTHBOUND			
Crude Oil (bbl/d)	211	271	307
Gasoline	165	173	108
Middle Distillate	22	50	27
Fuel Oil	291	188	250
Naptha	63	103	78
LPG	27	38	24
Other	39	27	19
Total Oil (bbl/d)	**818**	**850**	**813**
LNG (Bcf)	**281**	**48**	**97**
Number of ships			
Tankers	1,706	1,612	1,451
LNG	200	242	370
TOTAL			
TOTAL OIL (bbl/d)	**2,440**	**1,843**	**1,966**
Crude	**1,151**	**585**	**735**
Product	**1,288**	**1,258**	**1,232**
LNG (Bcf)	**596**	**852**	**1,416**
TOTAL SHIPS			
Tankers	**3,795**	**3,479**	**3,219**
LNG	**429**	**525**	**763**
SUMED flows (bbl/d)	**2,100**	**1,100**	**1,150**

Source: Suez Canal Authority, converted with EIA conversion factors. SUMED pipeline flows are EIA estimates based on APEX (Lloyd's MIU) Tanker Data.

**2010 information is year-to-date January-November*

Total Oil and Products

Total oil flows from the Suez Canal declined from 2008 levels of over 2.4 million bbl/d in 2008 to just under 2 million bbl/d on average in 2010. Flows through the SUMED experienced a much steeper drop from approximately 2.1 million bbl/d to 1.1 million bbl/d over the same period. The year-on-year difference reflects the collapse in world oil market demand that began in the fourth quarter of 2008 which was then followed by OPEC production cuts (primarily from the Persian Gulf) causing a sharp fall in regional oil trade starting in January 2009. Drops in transit also illustrate the changing dynamics of international oil markets where Asian demand is increasing at a higher rate than European and American markets, while West African crude production is meeting a greater share of the latter's demand. At the same time, piracy and security concerns around the Horn of Africa have led some exporters to travel the extra distance around South Africa to reach western markets.

Liquefied Natural Gas (LNG)

Unlike oil, LNG transit through the Suez Canal has been on the rise since 2008, with the number of tankers increasing from approximately 430 to 760, and volumes of LNG traveling northbound (laden tankers) increasing more than four-fold. Southbound LNG transit originates in Algeria and

Egypt, destined for Asian markets while northbound transit is mostly from Qatar and Oman, destined for European and North American markets. The rapid growth in LNG flows over the period represents the startup of five LNG trains in Qatar in 2009-2010. The only alternate route for LNG tankers would be around Africa as there is no pipeline infrastructure to offset any Suez Canal disruptions. Countries such as the United Kingdom and Italy received more than half of their total LNG imports via the Suez Canal in 2009 while over 90 percent of Belgium's LNG imports transited through the canal.

Electricity

Egypt 's installed generating capacity stood at 23.4 gigawatts (GW) as of 2008, with plans to further expand capacity through additional investments in natural gas, nuclear and renewable energy.

The Egyptian electrification rate in 2008 was approximately 99.4 percent, according to the International Energy Agency (IEA); this rate is among the highest in Africa with a 100 percent urban access to electricity and 99.1 in rural areas. Nonetheless, approximately 500,000 people still lack access to electricity.

According to EIA data, Egypt had an installed generating capacity of 23.4 gigawatts (GW) in 2008, 20.3 GW of which was conventional thermal generation capacity, 2.8 hydroelectric and 0.3 GW of wind generation capacity. Current peak demand is estimated to be 21.3 (GW). Ageing infrastructure and rising demand have led to intermittent blackouts. The summer of 2010 highlighted these problems, as the country experienced rolling nationwide blackouts.

Egyptian electricity consumption is increasing much faster than capacity expansions and the government is planning to invest over $100 billion in the power sector over the next decade, while also seeking financing from external sources. The private sector, international organizations, and renewable energy funds such as the World Bank's Clean Technology Fund have all provided investment in the sector. Under existing plans, Egypt hopes to produce 20 percent of its electricity from renewable energy by 2020 while also developing a nuclear power industry.

Sector Organization

Egypt's power sector is organized under the Egyptian Electric Holding Company which comprises sixteen affiliated companies (six production, nine distribution, and the Egyptian Electricity Transmission Company). Growing electricity demand in the late 1990s spurred industry restructuring and limited privatization of the sector. The country now has several privately-owned power plants which are either independent power projects (IPPs) or financed under Build, Own, Operate and Transfer (BOOT) schemes. BOOT projects allow for the financing and development of the large scale energy projects without affecting the country's debt profile.

Conventional Thermal

In 2008, conventional thermal energy sources accounted for 108.5 Billion kilowatt hours (Bkwh) of electricity generation, about 88 percent of the total. Almost all of this was met by domestically produced natural gas. Existing natural gas subsidies combined with plans to expand gas-fired generation capacity indicate that the fuel will continue to play an important role in Egypt's electricity mix.

High domestic demand for natural gas in all sectors is, in part, the result of government subsidies on the fuel. Subsidies have been costly to the Egyptian government, deterring major investments in the sector, and spurring rapid growth in domestic consumption that has affected Egypt's natural gas export revenues. However, attempts to remove the subsidies have been politically unpopular and difficult to implement.

Hydroelectricity

Egypt has a well developed hydroelectricity sector and, according to the energy minister, has utilized most of the Nile River's hydroelectric potential. In 2008-9, Egypt generated around 14 Bkwh from hydroelectric resources, almost all of which came from the Aswan High Dam and the Aswan Reservoir Dams.

Other Renewables

With the Nile River hydroelectric resources utilized, plans are underway to further develop the renewable energy sector. The most recent EIA data indicate that in 2008 wind farms accounted for only 0.9 Bkwh of electricity generation, with no contribution from other renewable sources. Government plans to reallocate natural gas resources for export combined with vast solar and wind resources will lead to further growth in the sector.

Solar

According to the Egyptian Electric Holding Company, other projects such as the 140-MW solar-thermal Kuraymat development should see start-up by 2012. This project is part of a general plan to export North African generated electricity to Europe through the Desertec project. The projects are expected to use concentrated solar power (CSP) with back up natural gas fired generators.

Wind

In December, the Egyptian government announced that it was planning to expand wind capacity by over 2.6 GW over the next five years as part of a plan to increase wind's share of electricity

generation to 12 percent. To this end, the government had said it would be inviting bids in 2011.

Nuclear

Egypt is also working on developing nuclear power as an energy source. It has a 22-MW nuclear research reactor at Inshas in the Nile Delta which began operation in 1997. The Ministry of Electricity and Energy in 2010 approved a 1,200 MW power station at al-Dab'a which is open to international participation and expected to become operational by 2019 as the country's first nuclear power plant. Bidding for the development of this plant was supposed to have started in early 2011. Three additional plants are planned by 2025.

International Connections

Work has been completed on the interconnection of Egypt's electric transmission grid with other countries in the region. The five-country interconnection of Egypt's system with those of Jordan, Syria, and Turkey was completed by 2002, and Egypt also activated a link to Libya's electric grid in December 1999.

Gulf Cooperation Council (GCC) Power Grid

The GCC Power Grid project plans to link Egypt to the GCC through Saudi Arabia. The link is expected to be complete between 2013 and 2015 and will allow the sharing of 3GW of electricity between the two countries. This project will indirectly expand each country's electricity capacity by pulling from each other's supplies at different peak hours. Longer-term plans call for broader interconnections that would include North Africa, the Middle East and Europe.

Profile

Energy Overview

Proven Oil Reserves (January 1, 2011)	4.4 billion barrels (Oil & Gas Journal)
Oil Production (2010)	660 thousand barrels per day
Oil Consumption (2010)	710 thousand barrels per day
Refining Capacity (2009)	975,000 bbl/d (OGJ and APS Review)
Proven Natural Gas Reserves (January 1, 2011)	77.2 trillion cubic feet (Oil & Gas Journal)
Natural Gas Production (2009)	2.21 trillion cubic feet
Natural Gas Consumption (2009)	1.57 trillion cubic feet
Recoverable Coal Reserves (2009)	23.1 million short tons (World Energy Council)
Coal Production (2009)	0.03 million short tons
Coal Consumption (2009)	1.39 million short tons
Electricity Installed Capacity (2008)	23.4 gigawatts
Electricity Generation (2008)	124 billion kilowatt hours
Electricity Consumption (2008)	109 billion kilowatt hours
Total Energy Consumption (2008)	3.2 quadrillion Btus
Total Per Capita Energy Consumption (2008)	41.0 million Btus
Energy Intensity (2008)	7,681 Btu per $2005-PPP**

Environmental Overview

Energy-Related Carbon Dioxide Emissions (2009)	192 million metric tons
Per-Capita, Energy-Related Carbon Dioxide Emissions (2009)	2.4 metric tons
Carbon Dioxide Intensity (2009)	.45 Metric tons per thousand $2005-PPP**

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power.
**GDP figures from Global Insight estimates based on purchasing power parity (PPP) exchange rates.

Links

EIA Links

EIA – Egypt Country Energy Profile

U.S. Government

CIA World Factbook - Egypt
U.S. Embassy in Egypt

U.S. State Department Background Notes

U.S. State Department Background Notes
U.S. State Department Consular Information Sheet - Egypt
BBC Country Profile - Egypt

MBendi Information Services Country Profile - Egypt
University of Pennsylvania African Studies Program - Egypt
Egyptian Government Information Portal (English)
Egyptian Atomic Energy Authority
Embassy of Egypt – Washington DC
Suez Canal Authority

Oil and Natural Gas

Egyptian General Petroleum Corporation (EGPC)
Egyptian Natural Gas Holding Company (EGAS)
OILEgypt.com

Sources

Afroil Africa Oil and Gas Monitor (Newsbase)
APS Review of Oil Market Trends
Business Monitor International – Middle East and Africa Oil and Gas Insights
Cedigaz Insights
Daily News Egypt
Eurasia Group
IHS Global Insight
International Energy Agency
Middle East Economic Digest
Middle East Economic Survey
Oil and Gas Journal
Petroleum Economist
Petroleum Intelligence Weekly
Reuters
Suez Canal Authority
U.S. Energy Information Administration

Contact Info

cabs@eia.gov
(202) 586-8800
cabs@eia.gov